

# *Chapter 1. General Introduction*

## INTRODUCTION

Treated effluent from the City of San Diego's Point Loma Wastewater Treatment Plant (PLWTP) is discharged to the Pacific Ocean through the Point Loma Ocean Outfall (PLOO) according to requirements set forth in Order No. R9-2002-0025, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0107409. The above Order and associated Monitoring and Reporting Program (MRP) were adopted by the San Diego Regional Water Quality Control Board (SDRWQCB) on April 10, 2002. During 2003, the MRP requirements for the Point Loma region were modified with the adoption of Addendum No. 1 to the above Order (see City of San Diego 2004), which became effective August 1, 2003, thus superseding and replacing all prior receiving waters monitoring requirements for the PLWTP. The above Order was further modified by the adoption of Addendum No. 2 on August 13, 2008, which gave the City approval to initiate operation of a prototype disinfection system at the PLWTP.

The MRP for Point Loma defines the requirements for monitoring receiving waters in the region off Point Loma, including the sampling design, compliance criteria, types of laboratory analyses, and data analysis and reporting guidelines. The main objectives of the ocean monitoring program are to provide data that satisfy the requirements of the NPDES permit, demonstrate compliance with the provisions of the 2001 California Ocean Plan (COP), detect movement and dispersion of the waste field in coastal waters, and identify any biological or chemical changes that may be associated with wastewater discharge.

## BACKGROUND

The City of San Diego began operation of the PLWTP and original ocean outfall off Point Loma in 1963, at which time treated effluent was discharged approximately 3.9 km offshore at a depth of

about 60 m (200 ft). From 1963 to 1985, the plant operated as a primary treatment facility, removing approximately 60% of the total suspended solids (TSS) by gravity separation. Since then, considerable improvements have been made to the treatment process. The City began upgrading the process to advanced primary treatment (APT) in mid-1985, with full APT status being achieved by July of 1986. This improvement involved the addition of chemical coagulation to the treatment process, and resulted in an increased TSS removal of about 75%. Since 1986, treatment has been further enhanced with the addition of several more sedimentation basins, expanded aerated grit removal, and refinements in chemical treatment. These enhancements have resulted in lower mass emissions from the plant. TSS removals are now consistently greater than the 80% permit requirement. Finally, the City began testing disinfection of PLWTP effluent using sodium hypochlorite solution in September 2008 following adoption of Addendum No. 2 to Order No. R9-2002-0025 (see above).

Additional improvements occurred in the early 1990s when the PLOO was extended about 3.3 km further offshore in order to prevent intrusion of the wastewater plume into nearshore waters and to increase compliance with standards set forth in the COP for water-contact sports areas. Construction of the outfall extension was completed in November 1993, at which time discharge was terminated at the original 60 m site. The outfall presently extends approximately 7.2 km offshore to a depth of 94 m (310 ft), where the pipeline splits into a Y-shaped multiport diffuser system. The two diffuser legs extend an additional 762 m to the north and south, each terminating at a depth of about 98 m (320 ft) on the outer continental shelf.

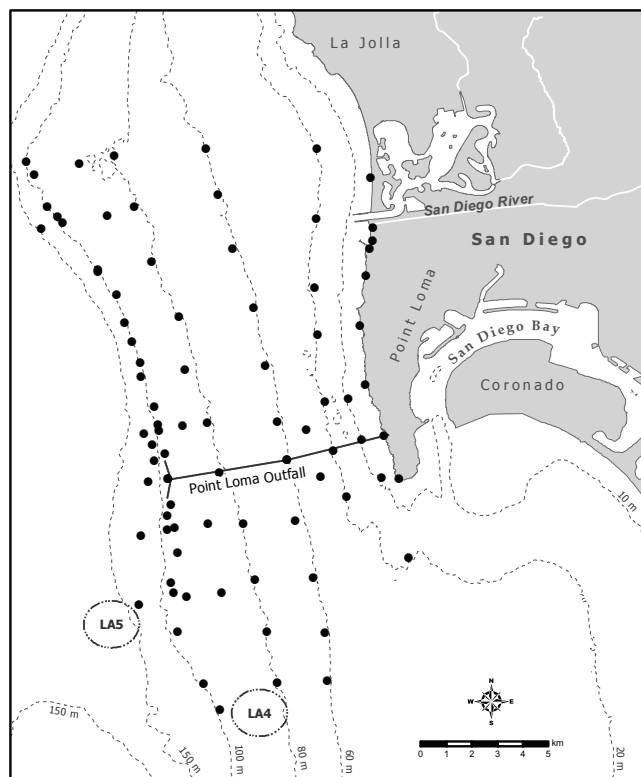
The average daily flow of effluent through the PLOO in 2008 was about 162 mgd, ranging from a low of 150.5 mgd in October to a high of 181.3 mgd in February. This is similar to the 2007 average flow of around 161 mgd. TSS removal averaged about

88% during 2008, with a total mass emissions of approximately 7169 mt/yr relative to 7577 mt/yr in 2007 (see City of San Diego 2009a).

## RECEIVING WATERS MONITORING

Prior to 1994, the City conducted an extensive ocean monitoring program off Point Loma surrounding the original 60-m discharge site. This program was subsequently modified and expanded with the construction and operation of the deeper outfall. Data from the last year of regular monitoring near the original inshore site are presented in City of San Diego (1995a), while the results of a 3-year “recovery study” are summarized in City of San Diego (1998). From 1991 through 1993, the City also conducted a voluntary “pre-discharge” study in the vicinity of the new site in order to collect baseline data prior to the discharge of effluent in these deeper waters (City of San Diego 1995a, b). Results of NPDES mandated monitoring for the extended PLOO from 1994 to 2007 are available in previous annual receiving waters monitoring reports (e.g., City of San Diego 2008a). In addition, the City has conducted annual region-wide surveys off the coast of San Diego since 1994 either as part of regular South Bay monitoring requirements (e.g., see City of San Diego 1999, 2008b) or as part of larger, multi-agency surveys of the entire Southern California Bight. The latter include the 1994 Southern California Bight Pilot Project (e.g., Allen et al. 1998, Bergen et al. 1998, 2001; Schiff and Gossett 1998) and subsequent Bight’98 and Bight’03 programs in 1998 and 2003, respectively (e.g., Allen et al. 2002, 2007; Noblet et al. 2003, Ranasinghe et al. 2003, 2007; Schiff et al. 2006), as well as the current Bight’08 regional monitoring survey that began during the summer of 2008 (e.g., Bight’08 CEC 2008). Such large-scale surveys are useful in characterizing the ecological health of diverse coastal areas and may help to identify and distinguish reference sites from those impacted by wastewater or stormwater discharges, urban runoff, or other sources of contamination.

The current sampling area off Point Loma extends from the shoreline seaward to a depth of about 116 m



**Figure 1.1**

Receiving waters monitoring stations for the Point Loma Ocean Outfall Monitoring Program.

(380 ft) and encompasses an area of approximately 184 km<sup>2</sup> (Figure 1.1). Fixed sites are generally arranged in a grid surrounding the outfall and are monitored in accordance with a prescribed sampling schedule. Results of relevant quality assurance procedures for the receiving waters monitoring activities are included in the EMTS Division Laboratory Quality Assurance Report (City of San Diego 2009b). Data files, detailed methodologies, completed reports, and other pertinent information submitted to the SDRWQCB and U.S. EPA throughout the year are available online at the City’s Metropolitan Wastewater Department website ([www.sandiego.gov/mwwd](http://www.sandiego.gov/mwwd)).

In addition to the above activities, the City participates in or supports other projects relevant to assessing ocean quality in the region. One such project is a remote sensing study of the San Diego/Tijuana coastal region that is jointly funded by the City and the International Boundary and Water Commission (IBWC). A long-term study of the Point Loma kelp forest funded by the City is also being

conducted by scientists at the Scripps Institution of Oceanography (see City of San Diego 2003), while the City also participates with a number of other agencies to fund aerial surveys of all the major kelp beds from San Diego and Orange Counties (e.g., MBC 2008). Finally, the current MRP includes plans to perform adaptive or special strategic process studies as determined by the City in conjunction with the SDRWQCB and U.S. EPA. Such studies have included a comprehensive scientific review of the Point Loma ocean monitoring program (see SIO 2004), a large-scale sediment mapping study of both the Point Loma and South Bay coastal regions (see Stebbins et al. 2004), and a pilot study of deep benthic habitats of the continental slope off San Diego (see Stebbins and Parnell 2005). Additionally, in 2004 the City began sampling again at the recovery stations mentioned above as part of a long-term annual assessment project of benthic conditions near the original outfall discharge site. In addition, a multi-phase project, the Moored Observation System Pilot Study (MOSPS), is underway to examine the dynamics and strength of the thermocline and local currents of the receiving waters off Point Loma (Storms et al. 2006). This project includes a system of moored temperature loggers (thermistor strings) and Acoustic Doppler Current Profilers (ADCPs) deployed in the vicinity of the PLOO to begin evaluating the major modes of circulation near the outfall.

This report presents the results of all regular receiving waters monitoring activities conducted as part of the Point Loma ocean monitoring program in 2008. However, in order for the City to participate in the Bight'08 regional monitoring program (see above), a resource exchange agreement was approved by the SDRWQCB that relaxed some regular monitoring requirements for both the Point Loma and South Bay regions. The relevant changes for 2008 included: (1) benthic sampling off Point Loma during July was reduced from 22 stations to the 12 "primary core" stations located along the 98-m depth contour; (2) trawl sampling off Point Loma during July was reduced from six stations to just the two trawl stations located nearest the outfall; (3) no sampling of 40 random stations required by the South Bay

permits was conducted during the summer. Results of the remote sensing surveys conducted during the year (Svejkovsky 2009) are also considered and integrated into interpretations of oceanographic and water quality data. Comparisons are also made to conditions present during previous years in order to evaluate any changes that may have occurred related to the outfall or other anthropogenic or natural events. The major components of the monitoring program are covered in the following chapters: Oceanographic Conditions, Microbiology, Sediment Characteristics, Macrobenthic Communities, Demersal Fishes and Megabenthic Invertebrates, and Bioaccumulation of Contaminants in Fish Tissues. A glossary of technical terms is included.

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